

REMARKS

This is in response to the Office Action that was mailed on February 17, 2006. New claims 6 and 7 are based upon disclosure in the paragraph bridging pages 17-18 of the specification. No new matter is introduced. Claims 1-7 are before the Examiner.

Applicants gratefully acknowledge the initialed copy of the Form PTO-1449 that was filed on April 5, 2005. The Examiner is respectfully requested to initial the Form PTO-1449 that was filed herein on January 5, 2005.

THE INVENTION. The present invention provides photoresist resins that are highly soluble in resist solvents. In accordance with the present invention, the content of polymers (polymer fractions) each having a molecular weight exceeding a specific level (4×10^4) is significantly reduced by adding a solution of monomers and a solution of a polymerization initiator dropwise from different vessels in dropping polymerization. See the paragraph bridging pages 18-19 of the specification. The resins of the present invention have a content of polymer fractions each having a molecular weight exceeding a specific level (4×10^4) at a specific level (4 percent by weight) or less. The resins of the present invention are easily dissolved in resist solvents and are free from turbidity.

Claims 1-5 were rejected under 35 USC § 102(e) as being anticipated by US 2004/0048192 A1 to Shima et al. (Shima) or by US 6,800,419 B2 to Soyano et al. (Soyano). The rejections are respectfully traversed.

Generally, a synthesized polymer contains molecules each having various chain lengths, as described in Chapter 1.3.1 of the “Polymer Science & Technology” text which accompanies this Amendment. Figure 1-8 in the text shows molecular weight distribution of a synthesized polymer, in which the distribution contains a significant portion of molecules (chains) having much higher molecular weights than the average molecular weight, as well as a significant number of chains having molecular weights much lower than the average molecular weight of the polymer. The molecular weight of a polymer is an average of the molecular weight of the various chain length molecules contained in the polymer. The text indicates on page 16 that the average molecular weights which are important in determining polymer properties are number-average molecular weight, weight-average molecular weight, and z-average molecular weight. Weight-average molecular weight is used in the present specification and in the references.

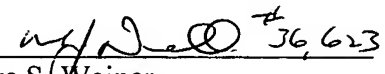
In many cases, molecular weight distribution in polymers does not cause any practical problems. However, in resist technology, it has been found that polymers having substantial portions of high molecular weight chains in them are not very soluble in resist solvents. It is difficult, however, to decrease the high molecular weight fractions in synthetic polymers. The present inventors decrease the content of polymers each having a high molecular weight – that is, a molecular weight exceeding 40,000 – by strictly controlling the manner in which the polymers of the present invention are synthesized.

Applicants respectfully submit that neither the Shima reference (paragraphs [0308] and [0602]) nor the Soyano reference (column 35, lines 5-16) teaches or suggests or in any way enables polymers that have a weight-average molecular weight of 3000 to 15000 and that have at the same time no more than 4% polymer fractions each having a molecular weight exceeding 40,000. Accordingly, withdrawal of the rejections of record is in order and is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Richard Gallagher (Reg. No. 28,781) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Dated: May 17, 2006

Respectfully submitted,

By  #36,623
RG Marc S. Weiner
Registration No.: 32,181
BIRCH, STEWART, KOLASCH & BIRCH, LLP
8110 Gatehouse Rd
Falls Church, Virginia 22040-0747
(703) 205-8000
Attorney for Applicant